

In re: Mackley et al.
Filed: June 12, 2006
Serial No.: TBD
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In the Claims:

Prior to determination of the claim filing fees, please substitute the following listing of claims for those of the original.

1-14 Cancelled.

15. (New) Apparatus for producing an extrudate product, the extrudate product including a plurality of capillary channels therethrough, the apparatus comprising an extruder having an inlet, a die including an orifice having a predetermined outer shape, a plurality of needles each having a body including an internal conduit for fluid flow, each needle further comprising an outlet from the internal conduit at an outlet end, the outlet end of each needle being arranged in a predetermined pattern substantially within the orifice of the die, the conduit of each needle being fluidly connected to a fluid source, wherein, in use:

a) extrudable material is fed into the extruder through the inlet;

b) the extruder forces the extrudable material around the bodies of the needles towards the die and through the orifice in the die to produce an extrudate having the predetermined outer shape;

c) the needles allow fluid to be drawn from the fluid source through the conduit to be entrained in the extrudate product to form capillaries such that the extrudate product

includes capillaries therealong in the predetermined pattern.

16. (New) Apparatus as claimed in claim 15, in which the outlets from the needles are regularly distributed within the orifice.

17. (New) Apparatus as claimed in claim 15, in which the die orifice is substantially rectangular having two long edges and two short edges.

18. (New) Apparatus as claimed in claim 17, in which the needles are arranged in a single line of needles substantially parallel with a long edge of the rectangular orifice.

19. (New) Apparatus as claimed in claim 18, in which the line of needles is arranged substantially centrally in the orifice.

20. (New) Apparatus as claimed in claim 15, in which the fluid source has a pressure substantially equal to that of the environment at the outlet of the die.

21. (New) Apparatus as claimed in claim 20, in which the fluid source is air from the atmosphere and the extrudate is extruded into the atmosphere.

22. (New) Apparatus as claimed in claim 15, in which the apparatus further comprises a gear pump between the extruder and the die.

23. (New) Apparatus as claimed in claim 15, in which the die is a converging die.

24. (New) Apparatus as claimed in claim 15, in which the apparatus further comprises draw down apparatus to draw down the extrudate.

25. (New) Apparatus as claimed in claim 15, in which the die orifice is an annulus.

26. (New) Apparatus as claimed in claim 15, in which the needles have an internal bore diameter in the range 0.1 to 2 mm.

27. (New) Apparatus as claimed in claim 15, in which the needles have an internal bore diameter in the range 0.2 to 0.6 mm.

28. (New) Apparatus as claimed in claim 15, in which the needles have an internal bore diameter of about 0.3 mm.

29. (New) A method for producing an extrudate product including a plurality of capillary channels therealong, the method comprising the steps of:

- a) providing an extrusion apparatus comprising an extruder having an inlet, a die including an orifice having a predetermined outer shape, a plurality of needles each having a body including an internal conduit for fluid flow, each needle further comprising an outlet from the internal conduit at an outlet end, the outlet end of each needle being arranged in a predetermined pattern substantially within the orifice of the die, the conduit of each needle being fluidly connected to a fluid source;

- b) feeding extrudable material into the extruder through the inlet;

- c) using the extruder to force the extrudable material

towards the die and through the orifice in the die to produce an extrudate having the predetermined outer shape;

d) using the needles allow fluid to be drawn from the fluid source through the conduit to be entrained in the extrudate product to form capillaries such that the extrudate includes capillaries therealong in the predetermined pattern.

30. (New) A method as claimed in claim 29, in which the method includes the additional step of drawing down the extrudate using draw down apparatus.

31. (New) A method as claimed in claim 29, in which the method further comprises the step of laminating two or more films together.

32. (New) A method as claimed in claim 31, in which the two or more films are laminated together using heat and pressure.

33. (New) An extruded polymer film, the film having a length and a substantially rectangular cross section perpendicular to said length, said cross section including two long sides and two short sides, the film includes a plurality of capillary bores

substantially parallel to the length of the film.

34. (New) An extruded film as claimed in claim 33, wherein the capillary bores are substantially elliptical and have a major axis length about 65 μm and a minor axis length of about 35 μm .

35. (New) An extruded film as claimed in claim 33, wherein each capillary bore has a substantially elliptical cross section with a long axis substantially parallel to the short sides of the film.

36. (New) An extruded film as claimed in claim 33, wherein each capillary bore has a substantially elliptical cross section with a long axis substantially parallel to the long sides of the film.

37. (New) An extruded film as claimed in claim 33, wherein the film is formed from linear low-density polyethylene.

38. (New) An extruded polymer tube having a length and an annular cross section, the tube including a plurality of capillary bores substantially parallel to the length of the tube.